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EDITORIAL COMMENT

The art of transseptal puncture – lost in translation?

A arte da punção transseptal – perdida na tradução?

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Transseptal puncture emerged 60 years ago and its indications have changed progressively over the decades. Currently, it is a technique performed by multiple disciplines with different objectives and training protocols. Greater accuracy and technological sophistication have replaced the fine art of the classical technique, which was guided solely by fluoroscopy.

In the 1950s, there was growing interest in left heart catheterization. The initial approaches included puncture of the left atrium (suprasternal, posterior transthoracic or transbronchial) and apical or subxiphoid puncture of the left ventricle.[1] John Ross, Andrew Morrow and Eugene Braunwald then developed transseptal puncture, which emerged as the standard technique to access the left heart.[2,3] In the next decade, transseptal puncture was pivotal for the study of left ventricular function and the diagnosis of obstructive hypertrophic cardiomyopathy and left heart valvular disease. In the 1970s, retrograde left heart catheterization progressively replaced the transseptal puncture technique, only for it to recover in the 1980s with the emergence of balloon mitral valvuloplasty.[4] Henceforth, the art of transseptal puncture was limited to specialized centers and dispersed among subspecialties. Interventional cardiology teams gradually lost their skills, due to the diminishing prevalence of rheumatic valve disease.

Subsequently, transseptal puncture was resurrected for atrial fibrillation ablation[5] and electrophysiologists became the experts in the field. It became an everyday procedure for pulmonary vein isolation and atypical left atrial flutter or ventricular tachycardia ablation. More recently, interventional cardiologists refined the technique for new and demanding transseptal structural interventions, such as left atrial appendage closure, mitral valve repair, mitral valve-in-valve, valve-in-ring and valve-in-MAC (mitral annular calcification), and mitral paravalvular leak closure. Increasing demand for safety and efficacy, as well as for enhanced precision, increased the complexity and sophistication of transseptal puncture. Multimodality imaging, mainly with transesophageal or intracardiac echocardiography associated with fluoroscopy, became the default for many centers.[6] What had been contraindications in the early days of transseptal puncture were overcome by the common use of multimodality imaging in conditions such as giant right atrium, severe rotational abnormalities of the heart and great vessels, kyphoscoliosis and marked dilation of the ascending aorta. Currently, the practice of transseptal puncture is varied, with different training requirements, performed by multiple subspecialties and tailored according to the demands of each intervention.[6] Additionally, many aspects of the fine art of the classical technique were lost over the years, due to the introduction of different protocols and technologies.

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The current issue of the *Journal* sees the publication of a small series by Martinez-Sande et al.[7] of 22 patients with atrial fibrillation and contraindication for iodinated contrast administration, who were scheduled for pulmonary vein isolation. As an alternative to contrast administration, transseptal puncture was followed by the introduction of a 0.014-inch floppy guidewire, to confirm correct positioning and to facilitate sheath advancement into the left atrium. Success was achieved in all patients, without complications. The authors considered this variation of the technique to be a reasonable solution for patients with severe contrast allergy and renal insufficiency in centers that rely mainly on fluoroscopy, with limited access to transesophageal or intracardiac echocardiography. The studied technique variation is not original.[8] In our opinion, a judicious classical technique with careful and accurate intracardiac pressure assessment avoids the use of a guidewire to confirm correct positioning. Nonetheless, we recognize the potential usefulness of this variation in difficult anatomies, in which crossing the septum is particularly challenging, requiring unusual sheath torqueing and forceful pushing. In these cases, the wire appears to provide extra safety by minimizing the risk of contact between the tip of the needle/dilator and the atrial free wall. We acknowledge the speculative nature of this debate given the fact that few or no trials have been performed in this field. However, it appears that wire-guided transseptal puncture does not mitigate the risk of crossing the muscular septum and is not a genuine alternative to multimodality imaging when a precise puncture is required.

In summary, transseptal puncture has been adapted and reinvented since its creation. It is still a demanding technique with a steep learning curve and considerable risk of severe complications. Technological advances have increased its accuracy and safety, but have undoubtedly also increased its complexity and affected the fine art of its beginnings. As the technique has been passed down through the generations, improvements have been sought and added, but some of its basic principles have been lost in translation.

Conflicts of interest

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